a bed on which the material is conveyed;

a plurality of drive springs, each said drive spring having a first end, a second end and a central axis, said first end of each said drive spring being attached to said bed, each said drive spring adapted to compress and extend along a line of stroke generally parallel to said central axis of said drive spring;

a plurality of inclined stabilizers, each said stabilizer having a first end, a second end and a longitudinal axis, said first end of each said stabilizer being attached to said bed, said longitudinal axis of each said stabilizer being generally perpendicular to said central axis of a drive spring, each said stabilizer being more rigid in a direction transverse to said line of stroke than said stabilizer is rigid in the direction of said line of stroke, said stabilizers allowing movement of each said drive spring generally parallel to said central axis of said drive spring and inhibiting movement of each said drive spring generally transversely to said central axis of said drive spring;

a first pair of rotatable eccentric weights coupled to said bed, said first pair of rotatable eccentric weights including a first rotatable eccentric weight and a second rotatable eccentric weight; and

a second pair of rotatable eccentric weights coupled to said bed, said second pair of rotatable eccentric weights including a third rotatable eccentric weight and a fourth rotatable eccentric weight, said rotatable eccentric weights being free-wheeling with respect to one another and adapted to rotate at substantially the same operating speed with respect to one another, each said rotatable eccentric weight adapted to provide an output force generally perpendicular to its axis of rotation, said rotatable eccentric weights adapted to accumulatively synchronize with one another without being rotationally coupled to one another;

whereby rotation of said first pair of rotatable eccentric weights and rotation of said second pair of rotatable eccentric weights, in combination with said stabilizers, accumulatively synchronize such that the output forces of said rotatable eccentric weights and their respective power outputs accumulatively add to cause said bed to vibrate along said central axes of said drive springs.

3. (Amended) The vibratory conveying apparatus of claim 1 including a first pair of vibratory motors, said first pair of rotatable eccentric weights being respectively attached to said first pair of vibratory motors, and a second pair of vibratory motors, said second pair of eccentric weights being respectively attached to said second pair of vibratory motors.

4. (Amended) The vibratory conveying apparatus of claim 3 wherein said drive springs have a natural frequency of vibration and said vibratory drive motors are adapted to rotate said eccentric weights at substantially the same operating speed, said natural frequency of said drive springs being greater than said operating speed of said vibratory motors.

6. (Amended) The vibratory conveying apparatus of claim 1 including a counterbalance, said second ends of said drive springs and said second ends of said stabilizers being attached to said counterbalance.

12. (Three-Times Amended) A vibratory conveying apparatus adapted to vibrate and to convey material, said vibratory conveying apparatus including:

a bed on which the material is conveyed;

a counterbalance;

a plurality of isolation springs attached to said counterbalance, said isolation springs adapted to support said counterbalance;

a plurality of drive springs, each said drive spring having a first end attached to said bed, a

second end attached to said counterbalance, and a central axis, each said drive spring adapted to compress and extend along a line of stroke generally parallel to said central axis of said drive spring,

a plurality of stabilizers, each said stabilizer having a first end attached to said bed, a second end attached to said counterbalance and a longitudinal axis, said longitudinal axes of said stabilizers being generally parallel to one another, each said stabilizer being more rigid in a direction transverse to said line of stroke than said stabilizer is rigid in said direction of said line of stroke, said stabilizers allowing movement of each said drive spring generally parallel to said central axis of said drive spring and inhibiting movement of each said drive spring generally transversely to said central axis of said drive spring;

a first pair of rotatable eccentric weights rotatably attached to said counterbalance, said first pair of rotatable eccentric weights including a first rotatable eccentric weight and a second rotatable eccentric weight; and

a second pair of rotatable eccentric weights rotatably attached to said counterbalance, said second pair of rotatable eccentric weights including a third rotatable eccentric weight and a fourth rotatable eccentric weight, said rotatable eccentric weights being free-wheeling with respect to one another and adapted to rotate at substantially the same operating speed with respect to one another, each said rotatable eccentric weight adapted to provide an output force generally perpendicular to its axis of rotation, said rotatable eccentric weights adapted to accumulatively synchronize with one another without being rotationally coupled to one another;

whereby rotation of said first pair of rotatable weights and rotation of said second pair of rotatable weights, in combination with said stabilizers, accumulatively synchronize such that the output forces of said rotatable eccentric weights and their respective power outputs accumulatively

add to cause said bed to vibrate along said central axes of said drive springs.

15. (Three-Times Amended) A method of vibrating a conveying apparatus to convey material, said method including the steps of:

providing a bed having an inlet end and an outlet end on which material is adapted to be conveyed;

providing a plurality of drive springs, each drive spring having a first end attached to said bed and a second end attached to a support, each said drive spring adapted to compress and extend along a line of stroke;

providing a plurality of stabilizers attached to said bed, each said stabilizer being more rigid in a direction transverse to said line of stroke than said stabilizer is rigid in the direction of said line of stroke;

providing a plurality of pairs of vibratory motors, each vibratory motor having a rotatable eccentric weight, said eccentric weights being free-wheeling with respect to one another, each said vibratory motor adapted to operate at substantially the same operating speed and to provide an output force generally perpendicular to its axis of rotation, said rotatable eccentric weights adapted to accumulatively synchronize with one another without being rotationally coupled to one another;

operating said vibratory motors to rotate said eccentric weights, such that said rotating eccentric weights accumulatively synchronize and accumulatively add their output forces and their respective power outputs and thereby vibrate said bed along said line of stroke at a vibration frequency; and

operating each said vibratory motor at substantially the same selected operating speed which approaches being equal to, or is less than, the natural frequency of said drive springs which are

vibrating said bed.

17. (Three-Times Amended) The method of claim 15 including the step of uniformly adjusting the vibration frequency of said bed by electrically and simultaneously adjusting the rotational speed of each of said vibratory motors, while said vibratory motors continue to operate at substantially the same rotational speed with respect to one another.

18. (Three-Times Amended) The method of claim 15 including the step of adjusting the operating stroke and frequency of said drive springs and stabilizers by use of an electrical control connected to each said vibratory motor for simultaneously changing the rotational speed of said vibratory motors, while said vibratory motors continue to operate at substantially the same rotational speed with respect to one another.

REMARKS

The above-identified patent application has been carefully reviewed in view of the Final Office Action of October 1, 2002. The Office Action rejected claims 1-18 under §112 as the amendment of the claims to include the limitation "self-phasing" was said to constitute new matter. Claims 1-18 were also rejected under §112 as being indefinite in regard to the terms "relatively rigid" and "relatively weak". Claims 1-18 were rejected as being obvious over Dumbaugh Patent No. 4,149,627 in view of Rosenstrom Patent No. 6,024,210. Claims 1-18 were rejected as being obvious over Dumbaugh in view of Venanzetti Patent No. 3,407,670. Reconsideration of this application is respectfully requested in view of the amendments above and the remarks which follow. Entry of the above amendments after final is respectfully requested to place this application in condition for allowance.

In the Office Action claims 1-18 were rejected under §112 as independent claims 1, 12 and 15